



# EPIDEMIOLOGICAL STUDY OF PARAMPHISTOMOSIS IN CATTLE IN AND AROUND BHUBANESWAR, ODISHA

Received - 23.03.2015  
Accepted - 25.05.2015

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## Abstract

*Epidemiology of paramphistomosis in cattle was studied from March, 2011 to February, 2012 in and around Bhubaneswar, Odisha. The overall infection rate was found to be 9.5% throughout the year. Seasonwise, the maximum prevalence was recorded in monsoon and post monsoon period (17.5 per cent) followed by summer (9.8 per cent) and least in winter (5.3 per cent) ( $P < 0.0005$ ). Slightly higher infection rate was observed in younger cattle (10 per cent) than older ones (8.4 per cent) ( $P > 0.05$ ). Male animals (10.2 per cent) were more commonly affected than females (9.1 per cent) ( $P > 0.05$ ).*

**Keywords:** *Epidemiology, paramphistomosis, cattle, Bhubaneswar.*

Paramphistomosis is an important helminthic disease of domestic ruminants of tropical and sub tropical countries (Hoarak, 1971) which cause heavy economic loss to live stock industry through huge mortalities in young ruminants and loss of production in adult animals. In some areas viz., India, the Republic of South Africa, Australia, mortality may reach 80-90% and reports have recorded mortalities

of 30-40% in cattle and sheep. (Boray, 1959; Boray, 1969; Soulsby, 1965).

Keeping in view the importance of the disease, the present study was undertaken to understand the current status of paramphistomosis in cattle in and around Bhubaneswar so that proper preventive measure can be undertaken in the future to reduce the prevalence of disease in more efficient, specific and cost effective way.

## Materials and Methods

Epidemiology of paramphistomosis in cattle (using faecal samples from livestock farms, veterinary hospitals and household) was studied from March, 2011 to February, 2012 in and around Bhubaneswar, Odisha. During the study, the prevalence in relation to month, season, age and sex was recorded. A total of 5400 faecal samples (on an average 450 samples per month) were collected per rectum from the cattle and were examined by direct smear, floatation and sedimentation technique for the presence of the paramphistome eggs (Soulsby, 1982 and Foreyt, 2001).

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The effect of different risk factors (month, season, age and sex) on the disease prevalence rate was planned to be studied. The year was split into three main seasons i.e. summer (March to June), monsoon and post monsoon (July to October) and winter (November to February) as prevalent in Odisha. The animals were divided based on age (young i.e. below 2 year and old i.e., above 2 year) and sex (male and female). All collected data were entered to Microsoft excel 2007 spread sheet and analyzed using chi square test by Statistical Package for Social Science (SPSS) version 17.0 software (Snedecor and Cochran, 1994).

## Results and Discussion

The infection rate in livestock farms, veterinary hospitals and house hold cattle were found to be 9.5%, 10.7% and 8.5% respectively. The overall infection rate was found to be 9.5% throughout the year. Peak monthly prevalence of paramphistomosis was recorded in the month of July and August i.e., 19.3% and 23.1% followed by September and October i.e., 15.3% and 12.6% and least in January i.e., 2.7% (Table 1).

**Table 1.** Monthwise prevalence of of paramphistomosis in cattle

Month	Live stock farms		Vety. Hospitals		House hold		Overall% of infection
	N° affected/ N° examined	% of infection	N° affected/ N° examined	% of infection	N° affected/ N° examined	% of infection	
Mar 2011	7/150	4.6%	8/150	5.3%	6/150	4%	4.6%
Apr 2011	10/150	6.6%	12/150	8%	9/150	6%	6.8%
May 2011	8/150	5.3%	10/150	6.6%	7/150	4.6%	5.5%
June 2011	18/150	12%	20/150	13.3%	16/150	10.6%	11.9%
July 2011	29/150	19.3%	31/150	20.6%	27/150	18%	19.3%
Aug 2011	35/150	23.3%	36/150	24%	33/150	22%	23.1%
Sept 2011	23/150	15.3%	26/150	17.3%	20/150	13.3%	15.3%
Octo2011	18/150	12.0%	22/150	14.6%	17/150	11.3%	12.6%
Nov 2011	9/150	6%	11/150	7.3%	7/150	4.6%	5.9%
Dec 2011	5/150	3.3%	6/150	4%	5/150	3.3%	3.5%
Jan 2012	4/150	2.6%	5/150	3.3%	3/150	2%	2.7%
Feb 2012	5/150	3.3%	6/150	4%	4/150	2.6%	3.3%
Overall	171/1800	9.5%	193/1800	10.7%	154/1800	8.5%	9.5%

[ chi square value ( $X^2$ )= 264.729; Probability(P) <0.0005, level of significance = highly significant ]

Similarly, the maximum seasonal prevalence was observed in monsoon and post monsoon period i.e., 17.5% followed by in summer i.e., 9.8% and minimum in the winter i.e., 5.3% (Table 2).

Both monthly and seasonal fluctuation of the disease prevalence rate was found to be highly significant ( $P < 0.0005$ ). The occurrence

of paramphistomosis was more frequently recorded in younger cattle (below 2 year age) i.e., 10% than older ones i.e., 8.4%. But, the variation was non significant ( $P > 0.05$ ). Analysis of disease pattern in male and female animals revealed that the prevalence was slightly higher in male cattle i.e., 10.2% than female cattle i.e., 9.1% (Table 3). However, the variation was non significant ( $P > 0.05$ ).

**Table 2.** Seasonwise prevalence of paramphistomosis in cattle

Season	Livestock farms		Vet.Hospitals		House hold		Overall % of infection
	N° affected/ N° examined	% of infection	N° affected/ N° examined	% of infection	N° affected/ N° examined	% of infection	
Summer	43/600	15%	50/600	8.3%	38/600	6.3%	9.8%
Monsoon and post monsoon	105/600	17.5%	115/600	19.1%	97/600	16.1%	17.5%
Winter	23/600	8.3%	28/600	4.6%	19/600	3.1%	5.3%

[chi square value ( $X^2$ )= 212.092; Probability(P) <0.0005, level of significance = highly significant ]

**Table 3.** Age and Sex wise prevalence of paramphistomosis in cattle

		Live stock farms		Vet. Hospitals		House hold		Overall % of infection
		N° affected/ N° examined	% of infection	N° affected/ N° examined	% of infection	N° affected/ N° examined	% of infection	
Age	< 2yr	115/1153	9.9%	122/1067	11.4%	121/1347	8.9%	10%
	> 2yr	56/647	8.6%	71/733	9.6%	33/453	7.2%	8.4%
Sex	male	75/742	10.1%	68/557	12.2%	22/244	9%	10.2%
	female	96/1058	9%	125/1243	10%	132/1556	8.4%	9.1%

[for age: chi square value ( $X^2$ )= 2.387, Probability(P) >0.05, level of significance = non significant; for sex: chi square value ( $X^2$ )= 3.016, Probability(P) >0.05, level of significance= non significant ]

The overall prevalence recorded in the present study (9.5%) was higher as compared to 3.38% as reported by Shabih and Juyal (2006) in Punjab, India but lower than 40.1% as reported by Melaku and Addis (2012) in Ethiopia. But, the result was quite comparable to 7.89% as reported by Khan *et al.* (2008) in Pakistan. The variation may be due to difference in animal husbandry practices, sample size, herd composition, biological potential of snail and host, climate and topography of area.

The more prevalence in veterinary hospitals as compared to the live stock farms and house hold is that mostly weak and ill animals are brought to the hospitals and there is increased possibility of parasitic infection in less resistant hosts.

The higher incidence of paramphistomosis was recorded in monsoon and post monsoon periods during the year may be due to

the reason that this season is more conducive to the breeding of snails viz; *Indoplanorbis*, *Gyraulus* and *Lymnea* spp. and larval stages of flukes which is low in winter months as also reported by Chabra and Gill (1975). These findings are closely related to Mishra *et al.* (1997) and Khan *et al.* (2008). Also the emergence of cercariae are stimulated from the snail due to change in temperature and humidity in the beginning of rainy season leading more infection of young animals in July and August (Monsoon) and September and October (post monsoon). (Gupta and Singh, 1990 ; Chaudhri *et al.*, 1993 and Dutta *et al.*, 1995).

The greater prevalence of paramphistomosis in younger cattle correlates with the findings of Mage *et al.* (2002), Keyyu *et al.* (2006) and Khan *et al.* (2008). This may be due to lower resistance, poor nutrition and more exposure to the parasitic stages.

Comparatively higher infection rate in male animals than that of females can be explained on the fact that generally better managemental practice is provided to the female cattle for more economic advantages while the male cattle is allowed to graze freely in pastures (leading to more contamination with the infective stages of parasite) as observed by Mage *et al.* (2002), Pfukenyl *et al.* (2005) and Khan *et al.* (2008).

So, it can be concluded that proper anthelmintic treatment and snail population control can be emphasized in the late summer months to decrease the severe incidence of paramphistomosis in cattle in monsoon and post monsoon periods.

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